The Case of the Disappearing Sugar Cube

STANDARD 3240-01 Students will observe and describe chemical and physical change.

OBJECTIVE
3240-0101 Differentiate between common chemical and physical changes.
3240-0102 Analyze factors that influence chemical and physical change.

INTENDED LEARNING OUTCOMES

1a. Make observations and measurements
2d. Collect and record data using procedures designed to minimize error.
2e. Analyze data and draw warranted inferences.

Introduction

To help teach students how stirring, temperature, concentration, surface area and crushing affect reaction rates. This is an open ended activity which can also be used to assess students understanding of the affects of variables on reaction rates. Students should work in groups of at least two.

Materials

1 sugar cube per group
stirring rods
mortar and pestle or something to crush the cubes
50 or 100 ml beakers
Hot plate and pot to boil water with a ladle
graduated cylinders
stop watches

Procedure

1. Place 1 sugar cube in a 50 or 100 ml beaker with 40 ml of cold water and time how long it takes to dissolve and record the time. Have students use the classroom clock to time this one.
2. Place 1 sugar cube crushed in a 50 or 100 ml beaker with 40 ml of cold water, time how long it takes to dissolve and record the time.
3. Place 1 sugar cube crushed in a 50 or 100 ml beaker with 40 ml of cold water and stir it until it dissolves. Time how long it takes to dissolve and record the time.
4. Place 1 sugar cube crushed in a 50 or 100 ml beaker with 40 ml of hot water and stir it until it dissolves. Time how long it takes to dissolve and record the time.

Analysis

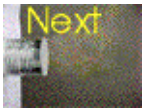
Begin discussion by asking students what things were the same in the four procedures? What things did we change? What affect did these changes have on the time it took the sugar to dissolve? What is a variable? Define for students what a variable is and then have them come up with a procedure that will dissolve the sugar cube the fastest and then have them test their hypothesis by racing against the rest of the students in the class.

Variation

If you have the time you can have the students do first solid cube cold water and then solid cube hot water. Then have the students do a crushed cube in cold and hot water. Finally have them do a crushed cube with stirring in cold and hot water.

Safety concerns:


Teachers and students, be sure to keep all Chemical and Fire Safety Rules that are specified by your teacher and in all general laboratory experiences.

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